

DYNO

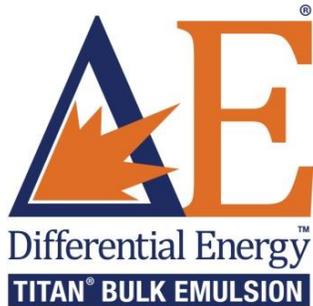
Dyno Nobel

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DIFFERENTIAL ENERGY CASE STUDY: TRIAL LEADS TO CONTINUOUS IMPROVEMENTS FOR MINE

Mine Reaches Goals of Improved: Safety, Air Quality, Productivity, Fragmentation and Lowering Overall Cost with Titan® 1000ΔE

SALT LAKE CITY, UT—*Dyno Nobel*, a global leader in commercial explosives, announces successful results of a trial taking place at a surface molybdenum mine in the United States. The mine agreed to an initial three month trial using Dyno Nobel's Differential Energy (ΔE) technology. The goal was to improve safety, particularly through NO_x reduction, along with improving blast performance with fragmentation, oversize and hard toes. By switching to Differential Energy the mine met every goal they set out to accomplish, which resulted in lowering their overall production costs.

To help address the problems the mine was having, Dyno Nobel employed its Titan 1000ΔE technology. Prior to the trial, the mine was loading dry holes with a 30/70 mixture (30% emulsion and 70% ANFO) and wet holes with 100% gassed emulsion.

The Dyno Nobel Differential Energy system allows blasters to accurately vary the density of chemically gassed emulsion as it is being loaded into the blast hole, enabling the operator to load multiple densities of gassed emulsion into the same hole and match the geology characteristics of the ground.

The mine had the challenge of blasting through a variety of different geologies from very hard rock to softer rock. Due to this, the blast crew loaded very high densities in the hard rock and much lower densities in the softer rock to maximize the efficiency of the blast.

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Groundbreaking Performance

Figures below illustrate the different density variations and the measured results of detonation velocity (VOD) from one of the blasts.

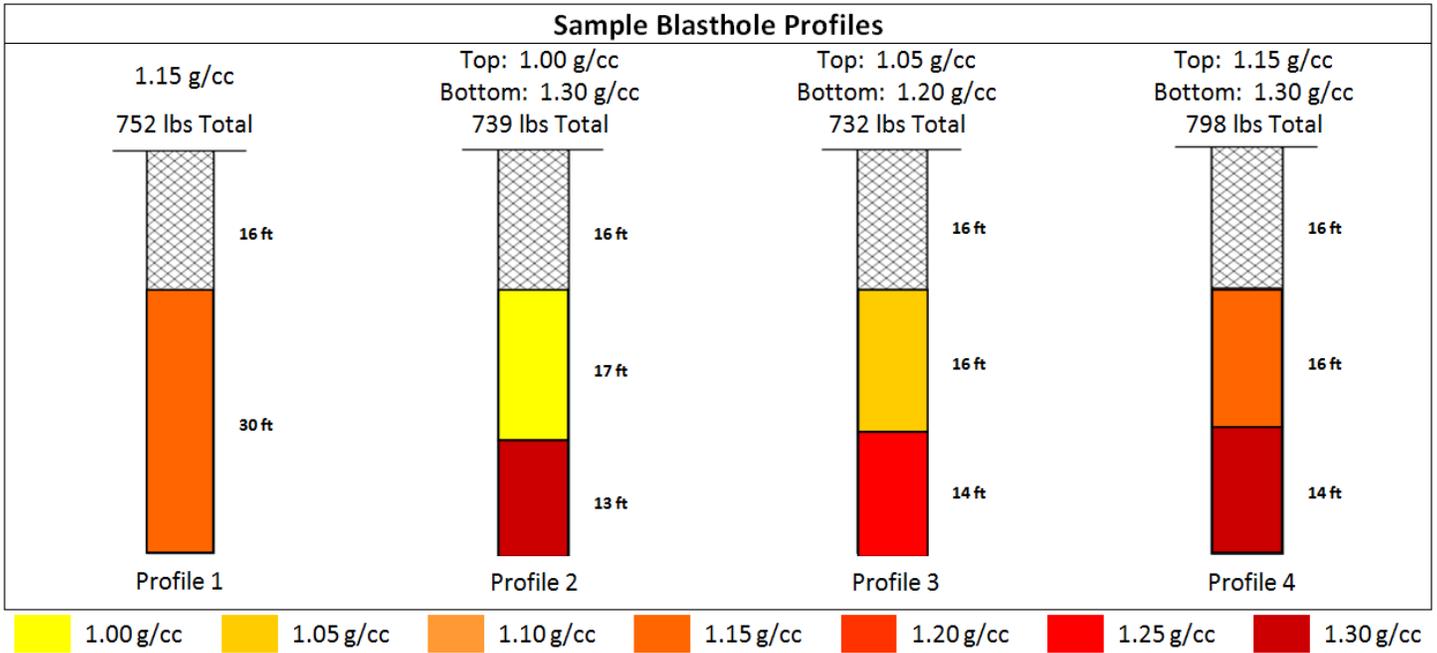


Figure 1: Examples of the different density variations that were used at the mine during the trial

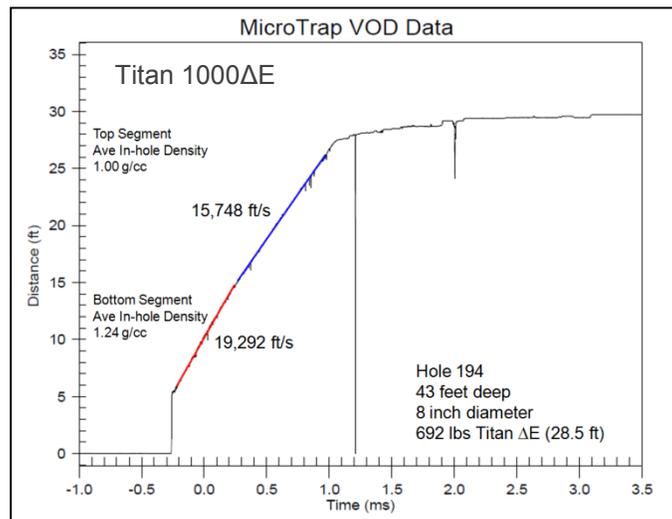


Figure 2: Results of detonation velocity measurements for one of the blasts

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The trial period was extended from three months to six months during which over 109 trial blasts were conducted to adequately measure air quality, mine productivity, fragmentation and dig-ability. The mine was able to meet the goals set forth at the beginning of the trial:

- Safety— Differential Energy proved to be a reliable and resilient product that provided dependable results where no undetonated blasting agent was found in the muck piles.
- Air Quality—The number and severity of NO_x incidents were significantly reduced. This allowed the mine to consider revising its air quality permit to allow for larger blast events.
- Productivity—Switching to Differential Energy allowed the mine to go from using two bulk trucks to a single truck that can load both wet and dry holes. The Differential Energy truck provided a faster turnaround time and a larger capacity allowing for more holes to be loaded per cycle.
- Fragmentation and Dig-ability—Oversized and floor grade problems were noticeably reduced. There were no physical measurements of fragmentation, but drill and blast managers and shovel operators observed a noticeable improvement in dig times.

Since the trial (now over a year later), the mine has fully adopted Differential Energy technology, using 100% Titan 1000ΔE and no longer uses ANFO. Dyno Nobel's Differential Energy technology enabled the mine to redistribute the explosive energy in the blast hole, distributing the accurate amount of energy throughout the hole, varying the detonation pressure. This process reduced NO_x, improved fragmentation, oversize and hard toes and increased productivity while reducing overall costs. Differential Energy—another practical innovation by Dyno Nobel!

About Dyno Nobel:

Dyno Nobel is a subsidiary of Incitec Pivot Limited ABN 42 004 080 264 (ASX:IPL). Dyno Nobel has customers in the mining, quarry, construction, pipeline and geophysical exploration industries. The company operates in Australia, Canada, the United States, Africa, Indonesia, Mexico, South America, Papua New Guinea and Turkey. Dyno Nobel manufactures a full line of commercial explosives, including ammonium nitrate, bulk explosives, packaged emulsions, dynamite, detonators (electric, nonelectric and electronic), cast boosters, and detonating cord, as well as surface and underground loading systems and Portable Modular Emulsion Plants. The company also offers services, including blast design, shot loading, shot service, vibration control, airblast, flyrock and NO_x reduction, through DynoConsult, a specialist consulting division of Dyno Nobel. Please visit www.dynonobel.com for more information.

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